Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID GEORGE FREIER, JOSEPH JOHN BIANCONI, and RICHARD DECENA ORNELAZ JR.

Appeal No. 2000-1182
Application No. 08/957,554

HEARD: January 25, 2001

Before HAIRSTON, RUGGIERO, and GROSS, Administrative Patent Judges.

GROSS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1, 3 through 11, 13 through 21, and 24 through 27. Claims 12, 22, and 23 have been objected to as being dependent upon a rejected base claim. Claim 2 has been canceled. On page 4 the Examiner's Answer, the examiner withdrew the rejection of claims 8 through 10 and 18. Accordingly, the claims remaining before us on appeal are

claims 1, 3 through 7, 11, 13 through 17, 19 through 21, and 24 through 27.

Appellants' invention relates to an optical waveguide in which at least a portion of the inner surface of the cladding is roughened to provide light extraction from the waveguide. The degree of roughness varies along the length of the waveguide, producing a pattern of light extraction. Claim 1 is illustrative of the claimed invention, and it reads as follows:

1. An optical waveguide comprising:

a flexible core of light transmitting material having an axis in the general direction of light flow through the optical waveguide; and

a flexible cladding surrounding the core to provide a flexible optical waveguide, the cladding having an index of refraction that is less than an index of refraction of the core, the cladding comprising an inner surface which is roughened with indentations to extract light from the core, the indentations being substantially non-parallel with respect to the axis of the core and providing a plurality of roughened regions along a length of the cladding, with at least two of the regions having different degrees of roughness provided by the indentations, to produce a light extraction pattern from the waveguide.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Ishiharada et al. (Ishiharada I) 7-198947 Aug. 01, 1995

(Japanese Kokai Patent Publication)
Ishiharada et al. (Ishiharada II) 7-198951 Aug. 01, 1995
(Japanese Kokai Patent Publication)

Claims 1, 11, 13 through 15, 17, 19, 24, and 25 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ishiharada I.

Claims 20, 21, 26, and 27 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ishiharada I.

Claims 3 through 7 and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ishiharada I in view of Ishiharada II.

Reference is made to the Final Rejection (Paper No. 12, mailed May 28, 1999) and the Examiner's Answer (Paper No. 22, mailed May 3, 2000) for the examiner's complete reasoning in support of the rejections, and to appellants' Brief (Paper No. 20, filed March 30, 2000) and Reply Brief (Paper No. 24, filed July 6, 2000) for appellants' arguments thereagainst.

OPINION

We have carefully considered the claims, the applied prior art references, and the respective positions articulated by appellants and the examiner. As a consequence of our

review, we find that the teachings of Ishiharada I do not support either of the rejections based on Ishiharada I taken alone. We reach the opposite conclusion, however, with respect to the rejection based on the collective teachings of Ishiharada I and Ishiharada II. Accordingly, we affirm-in-part. We also enter a new ground of rejection using our authority under 37 CFR § 1.196(b).

We consider first the rejection of claims 1, 11, 13 through 15, 17, 19, 24 and 25 under 35 U.S.C. § 102(b) as anticipated by Ishiharada I. Appellants indicate on page 4 of the Brief that these claims stand or fall together as a single group. The only limitation of claim 1 at issue is "at least two of the regions having different degrees of roughness provided by the indentations, to produce a light extraction pattern from the waveguide," found in the last three lines of the claim. The same limitation appears in each of independent claims 15 and 25. Accordingly, we analyze claim 1 as representative.

Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as

well as disclosing structure which is capable of performing the recited functional limitations. RCA Corp. v. Applied Digital Data Systems, Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir.); cert. dismissed, 468 U.S. 1228 (1984). As to the particular limitation at issue, the examiner asserts (Final Rejection, pages 2-3, and Answer, pages 5-6) that in Ishiharada I the phrase "mean roughness" and the teaching of adjusting the surface roughness to increase luminance suggest a range of degrees of roughness such that different regions have different degrees of roughness. Appellants argue (Brief, page 5) that there is no discussion in Ishiharada I of providing different values of mean surface roughness along a single optical transmission tube. According to appellants (Brief, pages 5-7, and Reply Brief, pages 2-4), the mean surface roughness described in Ishiharada I is constant along the entire length of the waveguide.

We have carefully reviewed Ishiharada I, and we agree with appellants that there is no disclosure of a plurality of roughened regions along the length of the cladding with at least two of the regions having different degrees of roughness as recited in claim 1. Ishiharada I discloses adjusting the

roughness of the cladding only to the effect that the roughness alters the amount of light diffused through the cladding. We agree with appellants that Ishiharada I appears to contemplate a uniform degree of roughness along the entire length of the waveguide. Since Ishiharada I does not clearly disclose every feature of representative claim 1, we cannot sustain the rejection of claims 1, 11, 13 through 15, 17, 19, 24 and 25 as anticipated by the disclosure of Ishiharada I.

Next we consider the obviousness rejection of claims 20, 21, 26 and 27 over the teachings of Ishiharada I taken alone. The examiner's rejection fundamentally relies on an improper interpretation of the scope of the disclosure of Ishiharada I with respect to independent claims 1 and 15. Since Ishiharada I fails to support the rejection of claims 1 and 15 for reasons discussed above, the examiner, in rejecting claims 20, 21, 26 and 27 based solely on Ishiharada I, fails to establish a prima facie case of obviousness. Therefore, we will not sustain the rejection of claims 20, 21, 26 and 27 as formulated by the examiner.

Last we consider the obviousness rejection of claims 3 through 7 and 16 based on the combined teachings of Ishiharada

I and II. These claims stand or fall together as a single group except for claim 5 which is separately argued by appellants (Brief, pages 10-11). With respect to claim 3, the examiner notes that Ishiharada II teaches an optical waveguide in which the roughening of the cladding increases with increasing distance from the light receiving end in order to make the luminance uniform along the entire length of the waveguide. The examiner asserts (Final Rejection, pages 4-5) that it would have been obvious to apply this teaching to the waveguide of Ishiharada I to achieve the desirable goal of uniform luminance as taught by Ishiharada II.

Appellants respond (Brief, pages 10-11) by noting that the surface roughness in Ishiharada II is substantially parallel to the direction of light flow rather than non-parallel, as recited in claims 1 and 15 and as taught by Ishiharada I. Appellants argue that there is no suggestion or motivation for combining the teachings of Ishiharada I with the teachings of Ishiharada II to arrive at the claimed invention, since the devices of the two references are formed in different ways. The examiner responds (Answer, pages 10-11) that despite the differences between Ishiharada I and II,

the artisan would have been motivated to provide regions of different degrees of roughness in Ishiharada I to achieve uniform luminance along the length of the waveguide as taught by Ishiharada II.

We agree with the examiner that the invention of claim 3 would have been obvious within the meaning of 35 U.S.C. § 103 in view of the collective teachings of Ishiharada I and II. Ishiharada II teaches that for a given type of surface roughening, the degree of roughness should be increased with increasing distance from the light receiving end to maintain a uniform luminance along the length of the waveguide. We find that this teaching applies to any form of roughening which is designed to reflect light into and through the cladding to diffuse the light. Whether the surface features are predominately parallel or non-parallel to the direction of light, they effect the same principle of causing light to be reflected into and through the cladding. Ishiharada II is used for nothing more than its suggestion that different degrees of roughness provide uniform luminance along the length of the waveguide. The artisan would have been motivated to provide regions of different degrees of roughness

in Ishiharada I to make the luminance uniform along the length of the waveguide in Ishiharada I as suggested by Ishiharada II. For these reasons, we will sustain the examiner's rejection of claims 3, 4, 6, 7 and 16, which stand or fall together.

With respect to separately argued claim 5, appellants contend (Brief, page 11) that claim 5 recites that the roughening of the inner surface of the cladding increases with increasing distance from a nearest one of two or more light receiving ends which is not suggested by the applied prior art. Neither Ishiharada I nor Ishiharada II discloses a waveguide having two or more light receiving ends. We are unable to find any response by the examiner to appellants' argument nor any explanation as to the obviousness of the additional limitation. Since the examiner never addresses the feature of a waveguide having more than one light receiving end, he fails to establish a prima facie case of obviousness for roughening the inner surface of the cladding as recited in claim 5. Therefore, we cannot sustain the rejection of claim 5.

In summary, we have not sustained the rejections of claims 1, 11, 13 through 15, 17, 19 through 21, and 24 through 27 based on Ishiharada I or the rejection of claim 5 based on a combination of Ishiharada I and II. We have sustained the rejection of claims 3, 4, 6, 7 and 16 based on the collective teachings of Ishiharada I and II. Therefore, the decision of the examiner rejecting claims 1, 3 through 7, 11, 13 through 17, 19 through 21, and 24 through 27 is affirmed-in-part.

We make the following new ground of rejection under 37 CFR § 1.196(b). Claims 1, 11, 13 through 15, 17, 19 through 21, and 24 through 27 are rejected under 35 U.S.C. § 103 as being unpatentable over the collective teachings of Ishiharada I and II. Ishiharada I discloses a 3-5 meter long waveguide (translation, page 4) with a flexible cladding (translation, page 5) and a fluid core having a refractive index greater than that of the cladding (translation, page 7). As noted by appellants, Ishiharada I teaches roughening using non-parallel indentations of the inner surface of the waveguide cladding but does not teach that this roughening should be divided into regions of different degrees of roughness. (Ishiharada I also teaches blasting (translation,

page 7) to create the roughened surface, which forms randomly-spaced pits.) Ishiharada II teaches that the roughening of the cladding of a waveguide should be increased along the length of the waveguide with distance from the light source to provide uniform luminance along the length of the waveguide. For reasons we have discussed above, we find that it would have been obvious for one of ordinary skill in the art to alter the single degree of roughness in Ishiharada I to a plurality of degrees of roughness to make the luminance of Ishiharada I uniform, as taught by Ishiharada II.

Since claims 20 and 21 were argued separately by appellants, and since the same arguments would apply to the new ground of rejection, we will treat them individually here. We disagree with appellants (Brief, page 8) that "there is no indication that sandblasting is within the scope of ... [Ishiharada I's] blast treatment." We agree with the examiner (Answer, page 8) that the skilled artisan would consider sandblasting as the primary type of blast treatment contemplated by Ishiharada I. The level of the skilled artisan should not be underestimated. See In re Sovish, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985). Similarly,

we agree with the examiner (Answer, page 9) that the skilled artisan would appreciate that altering the velocity (or intensity) of the particles would change the surface roughness. Again, one should not underestimate the level of the skilled artisan. See Id.

CONCLUSION

The decision of the examiner rejecting claims 1, 11, 13 through 15, 17, 19, 24, and 25 under 35 U.S.C. § 102 and claims 5, 20, 21, 26 and 27 under 35 U.S.C. § 103 is reversed. The decision of the examiner rejecting claims 3, 4, 6, 7 and 16 under 35 U.S.C. § 103 is affirmed. A new ground of rejection of claims 1, 11, 13 through 15, 17, 19 through 21, and 24 through 27 under 35 U.S.C. § 103 has been added pursuant to provisions of
37 CFR § 1.196(b).

In addition to affirming the examiner's rejection of one or more claims, this decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b)(amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides, "A new

ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) provides:

> (b) Appellants may file a single request for rehearing within two months from the date of the original decision . . . .

37 CFR § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

> (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .
>
> (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

Should the appellants elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion

of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the appellants elect prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for reconsideration thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART
37 CFR § 1.196(b)

KENNETH W. HAIRSTON Administrative Patent Judge	)	
JOSEPH F. RUGGIERO Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
ANITA PELLMAN GROSS Administrative Patent Judge	)	

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